

## FORESTRY CONSERVATION MANAGEMENT PRACTICES FOR THE COMMON LOON

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## **INTRODUCTION**

The Natural Heritage & Endangered Species Program (NHESP), in collaboration with the Massachusetts Department of Conservation and Recreation's Division of Water Supply Protection and Bureau of Forestry, the Massachusetts Division of Fisheries and Wildlife's Forestry Program and the University of Massachusetts at Amherst's Department of Natural Resources Conservation and Extension Service, has prepared forestry conservation management practices (CMP) documents for certain rare species that are listed and protected by the Massachusetts Endangered Species Act (MESA). These CMP documents provide information on the rare species' life history and habitat requirements and make scientifically-based recommendations on how to minimize potential adverse impacts of forestry activities. The goal of these recommendations is to protect rare species populations and maintain rare species habitats for long-term viability, while maintaining the opportunity for the sustainable management of the state's forests.

The rare species information forming the basis of these documents has been gathered from a variety of sources. Information on specific rare species and their habitat requirements has been compiled from published scientific articles, books, unpublished reports, NHESP data, existing management guidelines from other states, and consultation with researchers who have first-hand experience with the species in Massachusetts. Information on forestry practices in Massachusetts has been gathered through discussions with foresters in the Departments of Conservation & Recreation and Fish & Game. Draft versions of the CMP documents will be released to the forestry community and to the public for review and comment. Final approval and acceptance of the recommendations will occur through consensus between the departments involved, prior to their implementation.

The NHESP will use these recommendations in its review of specific Forest Cutting Plans. The existence of the CMPs will improve the consistency of the NHESP's reviews of Forest Cutting Plans and will make the outcome of the Cutting Plan reviews more predictable to the forestry community. Users of these recommendations are advised that they do not supersede any law, regulation, or official policy of this or any other agency. Rather, these guidelines are intended to complement existing regulatory review processes by providing up-to-date, scientifically-based management recommendations for forestry activities as they impact specific species.

Although the best scientific information available and subject experts were consulted in preparing these documents, it is expected that new information will arise about the species' requirements and their response to habitat modifications. With the recognition that both forestry practices and rare species conservation require adaptive management it is acknowledged that the recommendations in these documents may need to be updated and revised in the future.

## **How to Obtain Rare Species Information**

Forest landowners, foresters, agents and other preparers of forest cutting plans are strongly encouraged to check maps of Priority or Estimated Habitat of rare species prior to filling out a Forest Cutting Plan. These maps can be checked by contacting the local Conservation Commission, the Department of Conservation and Recreation, certain public libraries, or viewing the maps online at MassGIS. It can then be determined if the forested area overlaps with a rare species Priority Habitat or Estimated Habitat. If any portion of the area to be harvested or impacted by the work overlaps with a rare species habitat polygon, then a MESA Information Request Form or Data Release Form should be submitted to the NHESP. The NHESP will then provide a list of rare species pertinent to the property. A processing fee of \$50 is required for MESA Information Requests and a written response from the NHESP to the request will occur within 30 days of receipt. (See the NHESP web site: [www.nhesp.org](http://www.nhesp.org))

After receiving the specific rare species information, foresters, loggers, or landowners should consult the corresponding rare species conservation management practices document (if available) and prepare their Forest Cutting Plan according to the recommendations. With advance knowledge of the rare species present in

the vicinity of the site, landowners or their agents will be able take into consideration the relevant rare species requirements prior to submitting a Forest Cutting Plan for review. This will result in fewer required revisions of Forest Cutting Plans after submittal and thus speed up the process.

### Useful Websites

NHESP Regulatory Review link to online maps of Priority and Estimated Habitats

<http://www.mass.gov/dfwele/dfw/nhESP/nhregmap.htm>

NHESP Rare Species Information Requests – MESA Information Request and Data Release Forms

<http://www.mass.gov/dfwele/dfw/nhESP/nhrequest.htm>

Department of Conservation and Recreation

<http://www.mass.gov/dcr/stewardship/forestry/>

MassGIS online data viewer “OLIVER”

[www.mass.gov/mgis/mapping.htm](http://www.mass.gov/mgis/mapping.htm)

## SUMMARY

The Common Loon (*Gavia immer*) is emblematic of wilderness experiences for many people. In the East, these birds spend the winter along the Atlantic coast. Adults move inland to freshwater lakes early in the spring, while sub-adults remain at sea. Territories are established by breeding pairs during their courtship and mating period. Nests are constructed on the ground along shorelines, on floating vegetation in protected bays and inlets, and on islands, where eggs and chicks are afforded greater protection from predators. Eggs are usually laid by the beginning of June and incubated for a month. The chicks leave the nest within 24 hours of hatching, but remain dependent on their parents for food and protection for the following two months. Adult Common Loons migrate back to coastal areas from late August to December, while the juveniles may stay on lakes until just before the water freezes.

The primary concerns about forestry practices within Common Loon breeding habitat are noise and visual disturbance to adults, resulting in failed reproduction. Habitat alteration surrounding nesting sites is also a concern since Common Loons are known to reuse nesting sites year after year. To avoid disturbing Common Loons and their reproductive activities, harvesting and other forestry activities involving motorized equipment within a 500-foot radius of documented nesting sites may occur only from August 1<sup>st</sup> to March 15<sup>th</sup>. No-cut areas with a 100-foot radius must be maintained around nesting sites so that re-use can occur.

## The Role of Forestry in Conservation of the Common Loon

Maintaining forested land around Common Loon breeding lakes is important for conserving viable populations of this bird. In addition, timber harvesting is often essential for private forestlands to remain economically viable, and if public and private forestlands are to supply renewable wood products to sustain local economies. However, forest managers need to recognize that the noise and visual disturbance from harvesting during the breeding season can potentially result in failed reproduction, and should look to conserve Common Loons and other rare species proactively, in order to maintain the integrity of forested ecosystems.

## SPECIES BIOLOGY

### Species Identification

#### Common Loon Biology Quick Reference Chart

**Adult size :** Wingspan 54 - 62 inches (136 cm – 155 cm)  
Weight 5.5 – 13.4 pounds (2.5 – 6.1 kg)

**Number of years to reach sexual maturity:** 3-7

**Clutch size:** 1 – 2 eggs

**Productivity (fledged young/nesting pair):** 0 – 1.75 since 1981 in MA (McAlice and Mostello, 2005)

**Life span:** probably 25 – 30 years

**Breeding Plumage Coloration:** black head, neck, and back, with white markings; breast and belly white

**Hatchlings:** first downy feathers are black or sooty with white breast and belly; black-gray bill, legs and feet; molting into a sooty brown plumage in three weeks

Most people are familiar with the breeding plumage of Common Loons: the white necklace or stripes on the side of the neck and the large, rectangular, white markings on the back contrasted by black. The breast and belly are white and the bill is black. Breeding males and females look the same, but males tend to be larger and heavier than females. Subadults and the winter/basic plumage of adults is very different from the breeding plumage; the underparts are still white, but the coloration above is gray to gray-brown, the throat is grayish-white to white with a heavily patterned neck, and the bill coloration becomes paler. Hatchlings have black-gray bills, legs and feet and their first plumage is black or sooty and their breast and belly are white. The first plumage is replaced by a second plumage after three weeks, which is sooty-brown in coloration.

### Life Span and Time to Maturity

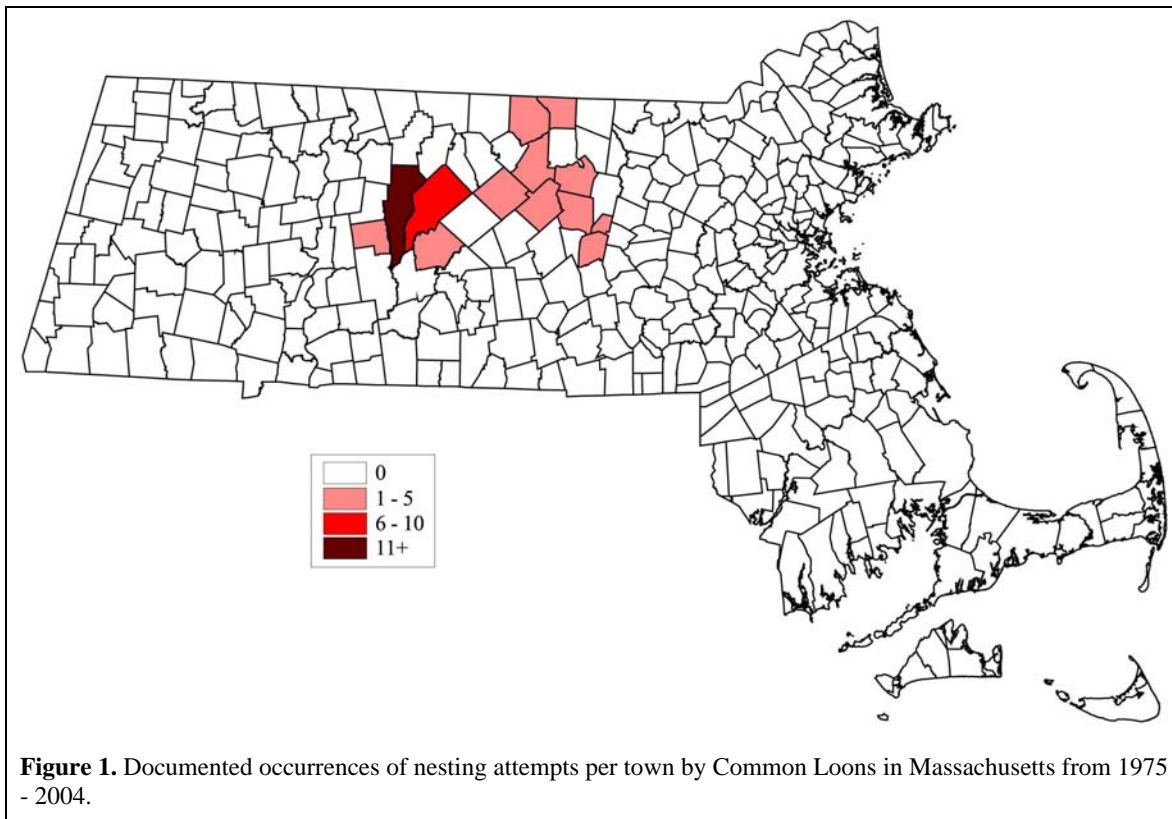
Loons are thought to begin breeding between the ages of 4 and 7 years old and to live as long as 25 – 30 years. Adult annual survivorship is 90% (Evers, 2004).

### Similar Species

There are two other loon species that are observed in Massachusetts, the Red-throated Loon (*G. stellata*) and the Pacific Loon (*G. pacifica*). Red-throated Loons are seen in Massachusetts along the coastline as migrants; they are occasionally seen inland and are uncommon to rare winter residents. In breeding plumage, the Red-throated Loon has a gray head and neck, and a rusty throat, and the back is black and spotted with white. Its winter plumage is similar to the Common Loon, but the Red-throated Loon is smaller and paler and its bill is thinner and upturned looking. The Pacific Loon is a rare winter visitor. It has a straighter bill that is not upturned like the Red-throated Loon, and its bill is smaller than the Common Loon. In breeding plumage, it has a grayer and paler head than the Common Loon. Its winter plumage has more contrast between the dark nape and white throat compared to the other loon species.

### Common Loon Range

The Common Loon breeds from north-central Alaska, northern Yukon, southern Baffin Island, and Greenland, south to northwestern Montana, southern Ontario, and southern New England. In the east, it winters along the coast from Newfoundland and Labrador south to Florida and Texas. The towns where Common Loon nesting attempts have been documented in Massachusetts are shown in Fig. 1.



## Life History of the Common Loon

Common Loon Life History Quick Reference Chart		
WHAT	WHERE	WHEN
Overwintering	Marine habitat: Atlantic coastline	Fall to early spring – September to March
Migration	Between coastline and inland freshwater lakes and reservoirs	Fall – late August to December  Spring – mid-March to early June
Courtship and mating	Aquatic and terrestrial habitat: courtship occurs on the water and mating on land	Spring – March to June
Laying and hatching	Freshwater shoreline areas	Nesting – May and June

Foraging	Aquatic habitat: freshwater and marine areas depending on time of year and age class	Hatching - end of June to July  Year round
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## Overwintering

In the east, Common Loons spend the winter along the Atlantic coast. They are rarely found inland during the winter as they require open water. However, during mild winters they may be found in the Great Lakes, other large lakes, reservoirs, and rivers. Along the coast they are associated with sheltered bays, inlets, channels, and shoals. Loons are particularly vulnerable to threats during the winter when they are molting and flightless. This period usually occurs for a few weeks in February.

## Common Loon Migration and Territory Size

Loons have two annual migration periods, in the spring and in the fall. The spring migration from coastal areas to inland lakes and reservoirs occurs from mid-March to early June. Arrival at interior water bodies used for nesting can occur just after the ice melts. Loons arrive in pairs or find mates shortly after their arrival. Breeding pairs establish territories that range in size from 25 – 500 acres. Loons defend their territories. Both males and females are known to attack and even kill other loons that attempt to intrude their territory. Loons that do not successfully nest will leave their territory by midsummer. By the late summer and early fall, loons that did successfully breed will join expanding flocks at pre-migration staging areas. Migration in the fall begins earlier for adults than for the juveniles, as the juveniles may remain on their natal lakes until just before the water freezes. The fall migration period occurs from late August to December. Young loons remain in coastal waters several years before returning to inland freshwater habitat to nest.

## Reproduction

Common Loons establish territories, breed, nest, and rear their chicks on freshwater lakes and reservoirs. They will often reoccupy previous territories and reuse old nest sites. Lakes with clean, clear water, abundant fish, indented bays, and islands are preferred. Courtship occurs in the spring and begins on the water but mating itself occurs on land. Nests are built just before egg-laying at the end of May and the beginning of June. Islands afford nests better protection from predators than the mainland, but shorelines of both are used as nesting sites. Common Loons will also use artificially constructed floating platforms for nesting. Common Loons in Massachusetts show a preference for the shoreline of islands and nesting platforms. Bays, promontories, and small peninsulas afford nest sites greater protection from wave and wind action. Nests are constructed on the ground and usually within 4 feet of the water's edge, as loons have limited walking ability (Evers, 2004).

One to two eggs are usually laid during the second half of May or early June and they are incubated by both adults for 28-29 days. When nesting birds are approached or disturbed, they will either crouch in position or may flush from the nest. Once the chicks hatch, they leave the nest within 24 hours. For the first two weeks after hatching, the chicks are in constant association with the adult loons. After hatching, the loons may stay in the area adjacent to the nesting site or they may move into nursery areas. Nursery areas are usually a sheltered bay or cove that is protected from the prevailing winds, where the wave action is reduced. Chicks are dependent on adults for food and protection for 2 months and are fully fledged when 10 – 12 weeks old. Chicks sit on their parents' backs to rest and to avoid predation. Reproductive success for loons at the southern limit of their breeding range is limited mostly by failures during incubation. Once chicks have hatched, their mortality rate is low.

## Foraging

The staple diet of Common Loons is live fish, such as yellow perch, pumpkinseed, and bluegill. They will also eat amphibians, insects, aquatic plants, crustaceans, mollusks, and leeches. Loons find their prey while swimming underwater, so good underwater visibility is needed. Most food items are consumed underwater, except for larger prey that are brought to the surface. Adults do not tear or regurgitate food for their chicks. Instead, the adults catch a large number of very small fish or aquatic invertebrates which can be swallowed whole by the chick. It has been estimated that a pair of loons and two chicks consume 950 pounds of fish in a single season (Barr, 1996).

## **Predators**

Common Loon eggs and chicks are vulnerable to predation whereas adults have few known predators. Nest predators include crows, Herring Gulls, skunks, raccoons, minks, and weasels. Chicks are preyed on by large fish (such as northern pike), snapping turtles, gulls, and Bald Eagles. Bald Eagles have also been observed to attack incubating adults.

# **COMMON LOON CONSERVATION CONCERNS**

## **Status Across Range**

Breeding populations of Common Loons in Connecticut, Idaho, and Wyoming are listed as critically imperiled. In Montana, Vermont, and Washington they are imperiled, and in New Hampshire they are vulnerable to extirpation. In Massachusetts, the Common Loon is currently a state-listed Species of Special Concern. The Common Loon was extirpated from Massachusetts in the late nineteenth century but returned to the state in 1975, when it was documented attempting to nest on the Quabbin Reservoir. By 2004, the number of pairs in the state had increased to 19 nesting pairs on 8 waterbodies, with 9 other territorial pairs, on four other waterbodies (McAlice and Mostello, 2005).

## **Activities that Impact Common Loon Populations**

### **Fluctuating Water Levels**

For Common Loons that nest on reservoirs where the water level is not maintained at a steady level, drawdowns or flooding may cause nest failures. Rapidly increasing water levels can flood nests, and falling water levels can leave nests stranded. Loon nests are most successful when water levels do not increase more than six inches or decrease more than 12 inches during the peak nesting season. Flooded nests have been observed in Massachusetts (Blodget, 2001). Reproductive failure due to drought conditions has also been inferred (Blodget, 1999). Nests stranded by drawdowns are also more susceptible to nest predation.

### **Lead Sinkers**

Common Loon mortality has been caused by lead poisoning due to the ingestion of lead fishing weights. Lead toxicity leads to the loss of fatty tissues, muscle atrophy, and immunosuppression. The behavior of loons with acute toxicosis includes drooped wing posture, head tremors, open-mouth breathing, beaching, and weakness, ultimately resulting in death. It is thought that loons ingest the fishing weights when they consume small pebbles to aid in the breakdown of food. The use of lead weights has been banned in some water bodies that have abundant loon populations. In Massachusetts their use is now banned at the Quabbin and Wachusett Reservoirs.

### **Mercury Poisoning**

Common Loons are used as an indicator for aquatic contaminants, such as mercury, that are known to accumulate in living organisms (known as bioaccumulation). Mercury can occur naturally in aquatic systems, but levels in waterbodies have increased in the past century due to atmospheric deposition of mercury from sources such as coal combustion, incinerators, and certain types of industries. Elevated mercury levels in certain fish in

Massachusetts have resulted in advisories against human consumption of these species. Mercury toxicity has been associated with loon mortality, and blood mercury levels of Common Loons in Massachusetts are elevated compared to other New England states (Savoy, 2004). Even at non-lethal levels, loon reproductive success and behavior can be negatively affected by increased concentrations of mercury in the blood.

## **Lake Acidification**

Acid precipitation can lead to lake acidification, which has negative impacts on loons in a number of ways. Superficially, the lake can seem more attractive for loons to establish a territory because the water becomes clearer and underwater visibility improves, making hunting easier. However, the prey base in the lake can be decreased by acidic conditions, resulting in greater brood mortality due to a shortage of food for the chicks. Acid precipitation also causes heavy-metal toxins such as mercury, aluminum, and cadmium to be released from the surrounding soil and bedrock into the food chain. These heavy metals can build up to toxic levels and affect fish abundance, as well as affecting loon directly.

## **Oil Spills**

In the past decade, hundreds of Common Loons have died off the New England coastline due to oil spills. Oil spills at sea during the winter months can be particularly detrimental to loon populations if it coincides with their flightless period during molting. Oil can affect a bird's ability to preen and the waterproofing of the feathers, resulting in birds that are hypothermic and emaciated, and have reduced chances for breeding because of compromised health.

## **Fishing**

Common Loon mortality has been documented in fresh and marine waters due to entanglement in fishing nets. Gillnets are particularly problematic in marine areas. The ingestion of fish hooks and entanglement in monofilament line also causes loon deaths.

## **Shoreline Development**

Shoreline development on lakes where loons nest is a concern for a number of reasons. Less habitat is available for nesting, water quality can be decreased, and an increase in nest predators, particularly raccoons, can result. Development for marinas, cottages, and camping sites may cause loons to relocate to marginal habitat, thus reducing breeding success. Increased development leads to more recreational activities, which affect loon reproduction negatively because of increased visual and noise disturbance.

## **Aquatic Recreational Activities**

In lakes with a lot of aquatic recreation, chicks and adults can be directly killed by collisions with boats. Chick mortality can also occur if they are separated from their parents by boaters, water skiers, or jet skiers. The wake of motorized boats can flood nests. Personal watercraft such as jet skis are more of a problem than larger boats because they can access shallow areas at high speeds, thus getting closer to loons' nests. If the adults are disturbed by boats and flushed from the nest, incubation is disrupted and predation of eggs can occur. Non-motorized boats such as canoes and kayaks also have the potential to disturb nesting loons since they are also able to access shallow areas.

## **Disease**

Loons are affected by a number of different diseases, including respiratory fungal infections, avian botulism, and parasitic infections. Loons may be more susceptible to diseases in the winter because their coastal feeding grounds are a harsher environment than the inland lakes where they spend the spring and summer. Similarly, the energy required for their winter molt may add additional metabolic stress such that the loons are more prone to



infection or have more difficulty fighting infection. Fungal infections are known to be more common in adult and immature birds at sea.

## **Forestry**

The primary concerns about forestry practices within Common Loon breeding habitat are noise and visual disturbances to adults, resulting in failed reproduction. Disturbance in the early spring could prevent loons from establishing a territory or cause them to abandon it. Courtship, mating, and nest construction could also be disrupted. Once eggs have been laid, disturbance is a concern because of the potential of flushing the parents from the nest or even abandoning it. This could result in egg mortality if the parents are kept off the nest for extended periods of time; the eggs may be more exposed to harsh weather conditions and make them more vulnerable to predation. Altering the habitat surrounding nesting sites is also a concern. The year-to-year reuse of nest sites can be greater than 80% (Strong et al., 1987). If the habitat surrounding a nesting site is altered, it may not be used again in following years.

## **RELEVANT LAWS AND REGULATIONS**

### **Massachusetts Endangered Species Act (M. G. L. Chapter 131A)**

In order to protect rare species and their habitats in Massachusetts, the Massachusetts Endangered Species Act (MESA) prohibits the ‘take’, possession, transport, export, sale or purchase of endangered species that are listed at the state or federal level. This includes all species that are listed as Endangered, Threatened or of Special Concern in Massachusetts. In reference to animals, “take” under MESA means to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, or to disrupt nesting, breeding, feeding or migratory activity.

Habitat for the rare plant and animals species protected under MESA has been delineated as Priority Habitat by the Natural Heritage & Endangered Species Program (NHESP). With a few exceptions, any project or activity that falls within mapped Priority Habitat could potentially result in a “take” and thus must file with the NHESP. The NHESP reviews the filing, assesses possible impacts and recommends avoiding or minimizing impacts. A permit for “taking” state-listed rare species may be issued by the Director of the Division of Fisheries and Wildlife if an insignificant portion of the local population of the rare species will be impacted and no other viable alternative for a proposed project or activity exists.

Land in forest use is exempt from this review and permitting process as long as the procedures under the Forest Cutting Practices Act are followed. A properly filed, NHESP- and DCR-approved and implemented Forest Cutting Plan provides an exemption to the normal filing requirements of the Massachusetts Endangered Species Act regulations. The use of herbicides and prescribed burns are not included in this exemption and projects that propose to use these management methods in Priority Habitat must file with the NHESP.

### **Massachusetts Wetlands Protection Act (M. G. L. Chapter 131 section 40)**

The Massachusetts Wetlands Protection Act regulations protect rare wildlife habitat within defined wetland resource areas from any adverse effects. Jurisdictional wetland resource areas include a variety of wetland types such as coastal wetlands, bordering vegetated wetlands, ponds, lakes, rivers, streams, lands subject to flooding, and riverfront areas. These wetland types include habitats that are important for providing food, breeding sites, shelter, overwintering sites, or migratory areas for rare wildlife. Activities or projects are not permitted to result in short or long term adverse effects to the habitat of state-listed wildlife species in the wetland resource area.

Habitat areas important for rare animal species that occur in wetland resource areas have been delineated on Estimated Habitat maps produced by the NHESP. Any activities that fall within Estimated Habitat and require the filing of a Notice of Intent under the wetlands protection regulations are reviewed by the NHESP. The NHESP has 30 days to respond to the proposed project.

Land in forest use is exempt from this process as well as long as procedures under the Forest Cutting Practices regulations are followed. A properly filed, NHESP- and DCR-approved and implemented Forest Cutting Plan provides an exemption to the filing requirements of the Massachusetts Wetlands Protection Act regulations.

### **Massachusetts Forest Cutting Practices Act (M. G. L. Chapter 132)**

The Massachusetts Forest Cutting Practices Act regulations require review of forest cutting plans for their potential impacts on rare species. Forest cutting plans are reviewed by state Service Foresters in the Department of Conservation and Recreation to determine if the proposed harvest area falls within a mapped Priority or Estimated Habitat for rare species. If the forest cutting plan does fall within a mapped habitat, then the plan is forwarded to the NHESP. The NHESP has 10 business days to comment on plans that fall within Priority Habitat and 15 business days if the plan falls within Estimated Habitat. The NHESP determines whether the proposed harvest will adversely affect the rare species or its habitat. The NHESP shall condition the Forest Cutting Plan, when necessary, to avoid any adverse effects to the habitat or any potential “take” to the rare species documented in the vicinity of a proposed harvest. Upon receipt of NHESP’s recommendations, the Service Forester modifies the cutting plan accordingly. If the approved cutting plan is consistent with NHESP’s recommendations and the Plan is complied with then it is presumed that potential violations of the Massachusetts Endangered Species Act and the rare species habitat

performance standard under the Wetlands Protection Act regulations have been avoided. This process is much more efficient and less complicated than having separate reviews under the Massachusetts Endangered Species Act and Wetlands Protection Act regulations.

## COMMON LOON FORESTRY CONSERVATION MANAGEMENT PRACTICES

**R** – required management practice

**G** – guideline or recommended management practice

### Preventing Disturbance and Reproductive Failure

#### Conservation management objectives

Avoid disturbing Common Loon adults during territory establishment, mating, and nesting. Avoid altering the habitat at or immediately surrounding documented nest sites.

#### Rationale

Common Loons have small clutches, usually only 1 or 2 eggs. Disturbing adults during their territory establishment, mating, and nesting periods can prevent territorial pairs from breeding, cause nest abandonment, expose eggs to harsh weather conditions, and increase chances of predation if adults are flushed from the nest. All of these factors lead to reproductive failure. Visual and noise disturbance that may alter adult behavior is the major concern with motorized forestry activities. Loons will reuse old nest sites. In order to encourage the continued use of previous sites, the habitat surrounding the nest should be left intact.

#### General management recommendations

Adjust the timing of mechanized timber harvest activities to periods when Common Loons are not establishing a territory, mating or nesting. Leave an uncut area surrounding nesting sites.

#### Specific management recommendations

**R** A no-cut area with a radius of 100 feet shall be maintained immediately surrounding nesting sites. Motorized equipment shall not be used within this no-cut area.

**R** For timber harvests that occur within a 500-foot radius of a Common Loon nesting site, motorized equipment, including chainsaws, may be used and harvesting may occur only between August 1<sup>st</sup> and March 15<sup>th</sup> of any given year.

Timber harvests involving motorized equipment may potentially proceed prior to August 1<sup>st</sup> in the following situations:

If a qualified wildlife biologist who has regularly monitored the Common Loon nesting area observes and certifies in writing to the NHESP that:

1. If at a documented nesting site and territory, no Common Loons are present that given year, timber harvests involving motorized equipment may occur beginning July 1<sup>st</sup>.
2. If at a documented nesting site and territory, Common Loons are present but have not laid their first nest by July 15<sup>th</sup> and are not showing any signs of nesting that given year, timber harvests involving motorized equipment may occur beginning July 16<sup>th</sup>.

**R** The boundary of the 100 and 500-foot management areas from the nesting site shall be clearly identified by flagging or marking prior to cutting plan approval.

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